**

***InsureNET Whitepaper***

1.1.2020

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**Version Control**

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| --- | --- | --- | --- |
| Version | Date | Author | Remarks |
| 1.0.1 | 03-20-2020 | Jason Romero | Initial |
|  |  |  |  |
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**Acknowledgements**

**1 About this document**

The purpose of this document is to give an analysis of basic principles of insurance on the Ethereum blockchain and a deduction on how we can build a token system on top of these principles, which is also sustainable and financially sound allowing transparency for individuals assessing risk.

First, we have seen that the development of an open protocol will be at the core of our efforts. This leads to a much broader approach, needs different legal entities and more funding. We have consequently increased our funding goal.

Second, we have seen that a reinsurance market will most probably not be the first step. Trading of risks (and tokenization of risks as a precondition) is a different regulatory area and probably more difficult to achieve; furthermore, without first establishing a regular insurance business we don’t have suitable risks to trade.

Third, we have seen that we need to apply for an insurance license in some relevant jurisdictions, namely in the DACH area (Germany, Austria, Switzerland) or in the European Union (Malta). Additionally, we also try to establish an insurance business in the US.

These three cornerstones don’t reflect in the former White Paper, which was centered around the tokenization of risks.

This White Paper is the attempt to structure the overall picture of decentralized insurance along the new insights.

**2 Why is insurance a candidate for blockchain?**

The multi-trillion-dollar insurance industry is dominated by huge corporations, weighed down by heavy regulation and plagued by misalignments of company and consumer incentives. The insurance world has devolved into an inefficient, expensive and ultimately frustrating industry. When customers most need help, they can end up fighting in vain for reimbursement from companies whose profits too often depend on avoiding paying out.

InsureNET is building a platform for decentralized insurance products and applications. With visionaries like you, we can create a platform full of opportunities across the industry’s value chain. Corporates, large and small, not-for-profit groups and insurtech startups can all come together to provide better products and services. We aim to use blockchain technology to help make the purchase and sale of insurance more efficient, enable lower operational costs, provide greater transparency into the industry and democratize access to reinsurance.

Blockchain can provide the means to disintermediate the market with a peer-to-peer risk platform that helps insurance return to its roots as society’s safety net. We even envisage new groups building their own bespoke insurance risk pools and services on the platform. And InsureNET will be a fully-compliant, fully licensed insurance platform for the emerging blockchain economy.

In short, InsureNET can deliver the insurance industry the modernization customers are crying out for.

We are assembling a team of experts, experienced in delivering innovative products and at the top of their game in blockchain.

**3 Analysis of Basic Insurance Paradigms**

**3.1 Overview**

We have analyzed the basic principles of insurance and developing a token system on top of these principles, which is sustainable and sound (later in this paper we will describe which kind of tokens we consider to be “sustainable” and “sound”).

First, we analyze insurance and break costs and capital flows down into three elements:

1. Expected value of risk

2. Capital costs for long tail risks

3. Transaction costs

We show that the first isn’t a source of profit, because it is only a redistribution of capital corresponding to sharing risks among the participants.

The second are a source of fixed income, at a certain risk. Capital has to be locked for a certain period in time, and there is a potential risk of losing the capital provided, e.g. in the case of a rare but catastrophic event, also known as “black swan event”. Capital providers are compensated for this risk. This compensation is calculated based on the lock-up time and on the risk of what is being insured.

The third are a source of entrepreneurial revenue and increase with higher efficiency of the business processes.

We argue that today insurance companies are the predominant way to organize these elements and that blockchain technology provides an opportunity to replace insurance firms by decentralized structures using a standardized protocol. Capital and revenue streams can then be represented by tokens. Our conclusion from this analysis is that we need two types of tokens.

The first one supports the coordination and economical incentivization of actors in a decentralized insurance system. This is the token to be discussed for a token sale to fund the development of a protocol and platform for decentralized insurance. We call these “protocol tokens” or iNET tokens.

The second type of token represents risks - this type will come as a collection of similar tokens, one for each risk pool, we call those “risk pool tokens” or iNETr tokens. These “risk pool tokens” or iNETr will be discussed in a separate document, as they underlie a different economic dynamic.

In a distributed environment with many participants, building products as a collaborative effort, the protocol token serves as glue, as collateral, and as representation of the material and immaterial value of the network, much as Ether serves as a means to secure the stability of the Ethereum Blockchain.

In Chapter 3, we detail the iNET protocol token. Chapter 4 shows a concrete example of the use of the token in an insurance context.

**3.2 Principles of insurance**

Lots of literature has been written on the theory of insurance, but the basic principles are simple. Let's start with an example. The example is of course simplified, and serves the sole purpose to explain the principle.

We consider a homeowner’s insurance. Insurance is about probabilities of losses, so it would be interesting to see what the probability of a damage is. A homeowner’s insurance typically covers a number of perils, including fire, natural disasters, water, and even falling objects. But it is difficult to obtain real numbers, as insurance companies 2 are not very transparent with their fundamental data. We will assume that, for our 3 examples, the probability is 0.1%.

For our fictional example, let’s assume insurance had not been invented yet. In this fictional world, Alice owns a house. The house is worth $100K. The probability of a complete disaster is 0.1% per year (that is one devastating event in 1,000 years). Alice wants to ensure that she has access to enough funds to get a new house in the case of a disaster. So, she decides to get a loan of $100K and has to pay redemption (also called principal) and interest rate. Additionally, she pays an interest rate of maybe 1%, so she has yearly costs of $1,100 ($100,000 loan \* 1% interest rate plus $100 annual redemption = $1100.00). Now we show how pooling risks in an insurance scheme reduces these costs drastically.

**3.2.1 Sharing the expected value of risk**

Assume 100,000 homeowners are coming together in a pool. Again, everybody pays a $100 share; this amount is now called the “premium”. They collect a total of $10,000,000 in premiums. But now there is a difference to Alice, who takes care only for herself: because of the law of large numbers, with a very high probability there will only be about 100 fires, causing a damage of about $10,000,000! And because the sum of all premiums is also $10,000,000, the whole damage can be paid out of the collected premiums, there is no need for every house owner to take on a loan. (Because premiums are collected at the beginning of the year, and all the houses “expected” to burn don’t all burn at the beginning of the year, but more or less are equally distributed over the year(s), there is a so called “float” of liquidity which can also generate a significant revenue. For simplicity, we won’t focus on this effect in this paper. So, the costs for each single house owner are now reduced from $1,100 to $100! This difference asks for an economical explanation. Let’s have a closer look into it. First of all, if all house owners would follow Alice’s example, they would need a huge amount of loans, from which only a tiny part of 0.1% would been needed in the average. It is clear that providing unused liquidity is costly. Pooling of risks in an insurance optimizes the use of capital, and the participants benefit from the reduced costs, not to speak from the difficulties to obtain a loan without collateralization! Second, if everybody only cares for himself, only a tiny fraction of participants is struck by disaster, and have the burden of actually paying back their loan. The others can pay back without loss, as soon as they don’t need protection. In an insurance collective, we have solidarity: with the premiums, everybody pays for the damages of the others. To summarize, the risk pool offers three advantages for the participants:

1. Building a large liquidity pool.

2. Guaranteed access to this liquidity in case of a damage.

3. Mutual subsidizing of damages.

Such a pool may be designed solely to benefit its’ participants, and to not make any “profit”. If the pool did generate profits, these profits could be distributed back to the participants, effectively reducing the premiums again to a level where no profits are generated. Such an insurance would have a loss ratio of 100%, because all premiums are used to pay the losses.

This is the very basic effect of risk transfer in insurance. Please note that the effect increases with the pool size.

**3.2.2 Sharing the long-tail-risks**

In some years, there are more fires, in other years, less. To account for these variations in damages, the whole pool has again to raise some money, e.g. $10M, to cover the unlikely event of a burst of many fires in one particular year. And let’s suppose that the interest rate for this capital is even particularly high, e.g. 20%. We will have total costs for this capital of $2M. The interest rate for the capital is a function of the risk and the riskless interest rate on the capital market; in an efficient market, the interest rate will compensate for the higher risk in comparison with a risk-free investment and will also contain a fair profit. So basically, this is where profits are generated for providing capital in an insurance structure.

The overall costs of $2M are distributed among all house owners, yielding an additional cost of $20 per house owner per year, which is added to the premium.

So, after this, there is also a protection against “long tail risks” or “black swan events”, at a cost of $20 per house owner. Again, the risk diversification effect increases with the pool size.

Overall, participants now pay $120 per year for their house insurance. The loss ratio is now reduced to 83% because of the capital costs of protecting the long tail risks.

**3.2.3 Sharing the transaction costs**

To organize 100,000 people in a pool, a professional structure is needed, otherwise, every single participant would have to talk to every other, which would simply be impossible. The operation of this professional structure adds transaction costs to the premium. This is the reason why insurance companies have come into existence: They provide a way to decrease transaction costs for the participants of the pool, creating an economy of scale and coordinating a huge number of participants and employees. The effect is considerable and enables the modern form of insurance with huge customer bases and a capitalization which can cover even global catastrophic events like hurricanes and earthquakes. However, the remaining transaction cost are still considerable: a recent study by KPMG shows the impact on the loss ratio, which is about 66% in the average.

**3.2.4 Information asymmetry**

Together with the reduction of transaction costs comes an asymmetry of information, which leads to a further increase of costs and to incredible profits for the big insurance companies. The unbounded collection of customer data and the exclusive exploitation of this data is a consequence of this imbalanced relationship. It creates an “unfair competitive advantage” for existing companies: companies with big data vaults can offer better products, and thus further optimize their data base.

One of the core goals of a decentralized insurance platform is the disruption of this circle, giving back to customers the ownership of their data.

**3.2.5 Summary**

The three elements described above; pooling or risk, risk transfer, and efficient administration are necessary. You can’t have insurance without each of them. For the purposes of this paper, I will call them:

1. expected value of the risk

2. capital costs for long tail risks

3. transaction costs

as we have seen, a community may not wish to generate profit from the first element. The second element yields a risk fee for binding capital which depends on the structure of the particular risk: It is typically lower if the risks are granular and uncorrelated; it is typically higher if the risks are clustered or correlated. The third one depends on the complexity of the process. A simple and highly standardized insurance “product” has a smaller transaction complexity than a more complicated, non-standardized product. This will reflect in lower transaction costs.

The three elements are completely independent of the underlying technology, economic environment or currencies. They are the atomic building blocks of every risk-sharing system.

As an additional aspect we have seen the information asymmetry which is inherent in the traditional insurance systems, and which is undesirable. The distribution of expected value (element 1) and capital costs for long-tail-risks among participants (element 2) is inevitable and not specific for a blockchain solution. Therefore, let’s focus on the third element.

Blockchain is essentially - among other aspects - a way to solve the transaction cost problem without firms. Without the “design pattern” of firms, transaction costs are 10 subjects to combinatorial explosion. The coordination costs for n participants are roughly of Order O(n 2) and firms reduce this to O(n). Because of this huge gain in efficiency, firms have many ways to hide profits in the transaction costs, and on the other side internal inefficiencies don’t show up fast. Transaction costs also appear in another context: regulations, which are deemed necessary to protect customers in a context with built in conflicts of interest. Regulations form a very effective “competitor” barrier to entry. While insurance companies often complain about the burdens of regulations, they actually don’t have much interest in reducing these burdens, as they discourage new competitors from entering the market.

**3.3 Blockchain can help to solve issues of traditional insurance**

While the current insurance business has evolved over centuries, and is optimized in many aspects, we have seen that it has severe shortcomings to the disadvantage of customers. We will outline some properties of an alternative system, which remedies these shortcomings. First, an alternative system should of course offer the basic ingredients of any insurance system: covering expected losses, covering long tail risks, and covering of necessary transaction costs. Obviously, we need ways to capitalize such a system, and we need a system to reduce transaction costs to a minimum. Transaction costs cannot be eliminated completely. But open markets have proven to be a solution for these challenges, and therefore, we propose a market-based approach with two components:

- an open marketplace for capitalization of risks

- an open marketplace for insurance related products and services

This is where blockchain comes into play: a decentralized solution on blockchain can implement such open marketplaces in a way that is collusion resistant and has no single points of failure. We can watch the emergence of many such marketplaces for different domains, like computation, file storage, exchange of assets; and insurance is just another domain in this respect. More specific, blockchain can help to solve four main problems which pile up costs in traditional insurance companies:

1. Coordination (“managerial”) costs.

2. Conflict of interest between customers and company.

3. Information asymmetry between customers and company.

4. Access to risk pools

**Advantage 1.** In traditional firms, you have two types of employees: the first group is doing the actual work, the second group is coordinating the whole system. The larger a company grows, the more energy flows in the second group (like a circle, the first group forms the rim of the circle, the second the area; the larger the circle, the less efficient are the processes, and the more energy flows into the coordination of the coordinators). Blockchain can help reduce these coordination costs. Instead of a posse of managers, “smart contracts” 11 can act as trustless hubs between the agents at the rim of the system, and thus eliminating most of the costs and the inefficiency of the management.

**Advantage 2.** In a traditional insurance company, the company “owns” the whole process, including the tasks which tend to raise conflicts of interest between customer and company. An obvious example is claims management: The claims manager has the explicit goal of minimizing payouts for damages, because he is employee of the insurance provider! Of course, there is a guild of “independent” appraisers and experts, but who pays their bills?

Blockchain can solve this conflict of interest, by enabling truly independent experts (who for example may be publicly ranked by their reputation for efficiency or fairness), and whose work is independent of the insurance provider, as well as being transparent and auditable by the whole community.

The same is valid for another area, where the conflict of interest is (intentionally) not obvious; consider Product Design. An insurance company has a big advantage over customers, because they can design products in a way which perhaps unfairly maximizes revenues (sales) and minimizes payouts (expenses).

For example if a customer expects a payout from an insurance policy they bought for a particular “event” but the insurance company does not provide the payout because the company maintains that the policy bought doesn't actually cover that “event”, the customer experience is severely degraded and trust is eroded between consumers and insurance providers.

**Advantage 3.**

Information asymmetry is in itself a source of inefficiency and high transaction costs. Insurance companies gather data and information in huge private silos by proprietary means and the data is often not shared., This data and the companies’ experience in analyzing the data is considered one of the main differentiators in the market. The reasoning behind decisions made based on this data is opaque and difficult to challenge. In a blockchain environment, all fundamental data and the decisions based on the data can be transparent and objectively validated.

**Advantage 4.**

The risk pools of traditional insurances are attractive investment vehicles, but currently, they are not open to the public, and the profits generated benefit only a small circle of investors. Blockchain can democratize the access to similar instruments, by tokenizing risks with “Risk Pool Tokens” or iNETr tokens. We will consider issuing of such tokens at a later point of time.

**3.4 Requirements and consequences of a decentralized implementation**

To offer an alternative to traditional company-centric insurance systems, we can identify some requirements and consequences for implementing a decentralized insurance protocol.

**3.4.1 General requirements for decentralized insurance**

1. We need a protocol and not just an (decentralized) application. Insurance is way too complex to be covered by a single application, and needs some means to incentivize participants to use it. Fostering “Network Effects” is one such mean 12 and can lead to a sustainable and growing user base. While a single contract can handle a single product, this singularity will not generate the network effects which are desirable to form multiple large pools of similar risks needed to get the benefits of the “law of large numbers” working. Decentralized insurance will work only if the value chain is decomposed and there is a way different participant can cooperate on the process in an interoperable way. A standardized protocol defines this way. The (architecture of the) protocol is the sole “central” part in the model.
2. A decentralized insurance protocol can replace “the firm”, by implementing a standardized set of rules for how stakeholders in the system interact with smart contracts and with each other using the protocol. By this, most of the coordination costs are replaced by autonomous and automated contracts and procedures and enforce efficiency by open market mechanisms. At the same time, a protocol does not impose a fixed set of code to the participants, but allows for flexible extension and interpretation of the basic rules.
3. The development and operation of a protocol needs funding. Even if we can drastically reduce the coordination costs, there are still the costs for the initiation of the system - e.g. acquisition of licenses, development of smart contracts, audits, as well as costs for agents at the “rim” of the system which we cannot eliminate completely. Therefore, we need a way to collect these costs from the ultimate customers and distribute them amongst these agents.
4. We also need a way to calculate and distribute the expected value of the risk and the capital costs for covering long tail risks amongst the customers.

**3.4.2 Requirements for token**

**Tokenization** may be the solution for these requirements - but only if the token is intrinsically required for the protocol to operate efficiently; i.e. “baked into” the protocol itself and usage of the protocol is only possible via tokens. If the token were not intrinsic to the use of the platform, then some new actor could replicate the protocol except without the token, and migrate users to the new protocol without the friction of a purely "rent seeking" token.

**Protocol tokens:** For the distribution of the transaction costs we need a different type of token. This token has to be designed in a way that incentivizes the use and the efficiency of the protocol: the revenue associated with this token or its price should increase with the efficiency and use of the underlying processes. In the next chapter, we describe a proposal for a token with these properties.

**Risk Pool tokens:** For the distribution of the expected value, and for the distribution of the capital costs for covering long-tail-risks, we need a type of token which generates a foreseeable profit. The profit solely depends on the underlying risk structure, the number of risks, their correlation, and so on. The value therefore depends only on the knowledge of the risk parameters (which can be incomplete) and mathematics. These tokens will e.g. yield a fixed revenue or generate an equivalent rise in price for their owners (which is equivalent). This type of token will be implemented in a second step.

Now that we have elaborated the necessary token types, we can back test if these tokens are “necessary” and InsureNET will build an economic space for decentralized insurance. The space will have a broad set of participants, customers, service providers, risk carriers, etc., the goal is to incentivize these participants to cooperate and behave well, and in line with the interests of the whole space. This space is difficult to build. It comes at a cost.

**What adds value to the space:**

Building Blocks consisting of resistance against forks and copycats. Licenses and formal approval by authorities cannot be copied. Operational model of infrastructures to run a business cannot be copied. Products code (frontend/backend) infrastructure certifications/audits developers product managers. Tech can be copied, but products are micro-ecosystems with development roadmap, user base, customer support, core development team, supporters and contributors. Users, customers, supporters, and contributors cannot be copied. Networks formal or informal relations to other projects, cannot be copied and relations to other projects are based on a common vision.

**Conclusion:** only tech can be copied easily. Most of the value-bearing components of the economical space (the value that participants bring) can’t be copied easily the economical space will offer opportunities to generate profits. These profits should benefit those who have participated to build up the space, and they will expect the platform to protect their participation. Reason: If you have two identical platforms, one platform with some kind of protection mechanism for its creators and contributors and one platform without such protection. The platform with protection will of course attract more contributors. It will have the stronger network effects. A platform without protection is subject to the “Tragedy of the Commons” In the prospect of decentralized exchanges the use of a token is no longer a barrier.

**3.5 Protocol**

**3.5.1 Owner of the protocol, governance**

As an open standard, the protocol will be a common good, it can be used and implemented by whoever likes it. We will take care that the entry barriers are as low as possible. However, for some portions of the protocol a certification will be necessary, to reflect regulatory obligations and restrictions.

We propose a US based foundation as legal body, which formally holds the IP rights of the protocol and ensures that the protocol can be used freely. We will establish a continuous, community driven protocol improvement process similar to the EIP process for the Ethereum Platform.

**3.5.2 Outline of workflow elements of the protocol**

* Application for policy Process of offering a product and applying
* Underwriting Process of accepting a policy
* Collection of premiums Payment process, one-time and regular payments
* Submitting of claims Process of submitting a claim, via oracle or manually
* Claims assessment Process of assessing a claim, via oracle or manually. A claims verification process allows the system to determine which policies are legitimately claimed and to propagate agreed payments to claimants. In the case of parametric insurance, this process references data feeds about insurable events and is (fully) automated.
* Identity Management & Privacy Process of KYC and AML, respecting privacy. This may involve private chains or off-chain storage of data.
* Admission / Certification Admission of participants to offer products and perform parts of the protocol
* Asset Management As funds flow in, we have to responsible use funds which are not immediately needed.

**3.6 Community of customers, users and companies**

The success of the platform will depend of a vivid community of users and companies. The token model should reflect and support this community. This community will play a central role in the realignment of incentives. Via tokens, customers can “own” their insurance. The community model should facilitate the development of future mutual and P2P-Insurance models. A community cannot be built from the outside, it has to grow from the inside. However, experience shows that there are some success criteria for communities.

**4 The iNET protocol token**

The proposed protocol token is an integral part of a decentralized insurance platform. It will have some desirable properties: It will not introduce additional fees. The usage of the token is free, and owners of a token do not receive a revenue from the use of the platform. However, participants can use the token in their profit-seeking enterprises. Therefore, there is no incentive to fork the protocol, as you can’t save costs by doing so.

**4.1 Protocol & platform**

The Protocol is a collection of Smart Contract Templates, Rulebooks, Standards, Best Practices which are developed and maintained by InsureNET and the community. There are many possible governance schemes for such a protocol; the governance should fit to the participants using it. Of course, meanwhile blockchain offers some interesting tools to formalize governance, but that should be left to developers and users. The platform is the community of all entities which make use of the protocol, and which are connected by a common economic interest. Providing insurance is a complex process, involving possibly many participants, as we have seen above.

* Customers of an insurance need to rely on the smooth operation of these participants.
* Fees have to be distributed along the value chain, but only if all parts of a process have been appropriately fulfilled
* Participants supplying critical parts (e.g. a risk model) have to assume liability for their work.
* Some products and services are needed by many participants, so it makes sense to offer them as shared products and services.

The platform will serve as marketplace for insurance-related services, which are offered according to the open protocol standard and which are therefore always interoperable. Protocol relates to platform like chess rules to board and figures. For clarity, we will use the term “protocol” exclusively.

**4.2 Role of the protocol token**

To make long story short, we need some strong economic principles to ensure the proper working of all participants and their cooperative, mutually supportive behavior. Therefore, we have designed the protocol tokens to bind participants to the platform and to assure the quality of the provided services. We are effectively implementing what is known as "Staking", focusing on the specifics of the risk transfer.

**4.2.1 Example**

Traditionally, economic relations are coded in form of legal contracts, which often have the form of “if-then” statements. “If you pay me $5.000, I’ll sell you my car”. In business contexts, we often have long-term contracts, like supply contracts or contracts for work and labor. These provide either a reward for a delivered good or service, a penalty for not delivering, or both. We will use oracles to obtain provable data from our data provider. Oracles charges us with some finneys for calling their contract, but we have no guarantee that oracles will deliver. We have two options to incentivize oracles to provide their service properly:

1. in a “buyers’ market” (i.e. a market with many competing oracles) we could demand oracles to put some tokens in a “staking contract”, which will return the tokens if they deliver in time and forward the tokens to us in case, they miss their obligations.

2. in a “sellers’ market” (i.e. a market with only one or few oracles) we can offer oracles an additional profit, again by staking tokens in a “staking contract”, but with reversed roles: InsureNET will stake tokens, and oracles will earn these tokens if they deliver, and in case they don’t deliver, the tokens are returned to us. 3. Of course, both options can be combined: both parties staking tokens, and the contractor earning tokens according to his performance. The “staking contract” is very simple, its signature is:

contract TokenStake {

[...]

function stakeFor(address \_staker, uint256 \_value) public returns (bool);

function stake(uint256 \_value) public returns (bool);

function releaseFor(address \_beneficiary, uint \_value) internal returns (bool);

function release(uint \_value) internal returns (bool);

}

The stakeFor and stake functions put some tokens in the contract where they are locked, until some predefined condition meets, in which case releaseFor or release are called and return the tokens to the respective beneficiary:

Example use cases for stake, stakeFor, release, releaseFor:

1. “stake”: A contractor stakes tokens as collateral for providing a service at a certain quality / service level.
2. “stakeFor”: A commissioner stakes tokens as reward for contractor, for providing a service at a certain quality / service level.
3. “release”: Tokens are released to staker in case the condition is fulfilled / quality is proven / service level met.
4. “releaseFor”: Tokens are returned to commissioner or “slashed” in case quality is not proven / service level not met.

**4.2.2 Decomposing the value chain**

Similar, a bunch of other contractual relationships could be modeled - each with a variant for “buyers” or “sellers” markets. Thus, we would like to decompose the value chain as far as possible and to engage market mechanisms to select those participants which offer a service at the best value. The illustration shows the roles typically found in an insurance value chain, and which roles are needed for a particular step in the chain.

Basically, you can separate each role as an independent business, which can work together flexibly and bind themselves via reward-or-stake token contracts. This is quite similar to the operating mode of a blockchain: Miners have an economic incentive for cooperative behavior. Some aspects of “good-behavior” comprise stability properties like:

* Promise to offer a certain service over a certain time (service stability)
* Promise to offer a certain service in a certain quality / with a certain SLA (quality stability)
* Promise to offer a certain service at a certain price (price stability)
* Promise to take a certain liability for a service (guarantees)

We propose to secure the platform and the products built on that platform via the protocol token. Participants (not customers) will need a certain number of tokens to enter the platform “ecosystem”. These tokens can be locked as collateral or offered as a reward (InsureNET will lock 10% of all token sales to this collateral fund). Depending on the service offered, a different number of tokens will be required or offered to use the platform or provide services on the platform. Simple services require a small number of tokens, complex or critical services will require a higher number of tokens. The number of tokens which have to be provided as collateral or reward will correlate to the potential damage from participant misbehavior or from the violation of the platform terms. These parameters may be subject to a platform governance model (in the future) where participants have voting power based upon tokens owned. Or, governance may be conducted automatically by the use of smart contracts. The proceeds from token sale(s) are used to nurture the development of the platform and to establish or provide central services as long as there is no independent participant providing them. A certain insurance product needs a collection of services chained together to some business process. Participants offering these services can organize to offer such a product (maybe there is a market for such services and a “product management service” doing the coordination work). It is even possible that the fees for some of the services offered by participants in the ecosystem may be negotiated on an open-market platform. The protocol will offer ways to distribute the premium to the various risk pools and to the participants who provide product “processing”.

**4.3 Participants on the platform and their use of the token**

**4.3.1 Customers**

Customers can buy insurance using the token. For convenience, third parties can offer payment gateways and integrations which remove the necessity to own cryptocurrency from the end customer. Furthermore, participants can choose to offer insurance products in any native currency - be it a cryptocurrency, a token or a fiat currency. **Use of token: Universal currency to buy insurance products.**

**4.3.2 Risk Model Providers and Actuaries**

Risk models are fundamental for any insurance product. The correctness of the model is precondition for the economic success of the product. With great impact comes great responsibility. Generally, because of the magnitude of value affected by errors and deviations in the model, a Risk Model Provider won’t take responsibility for the economic outcome of his model, but rather for his adherence to principles and established guidelines in his trade. E.g. a risk model should be built on a clear specification, and it should be validated by acknowledged testing methods before it is put into production. A risk model provider should therefore be rewarded according to such benchmarks. The economic risk of a model will usually stay with the party who runs the risk pool. Use of token: Staking/Reward for providing or updating risk models.

**4.3.3 Data providers and oracles**

One of the most promising application of a decentralized insurance space is the way data is collected and managed. Customer data should remain in the control of the customer, and blockchain technology offers new ways of monetization of data. Currently, data is collected together with the application for an insurance, and the insurance company “owns” the data - even after the insurance contract is no longer valid. In a blockchain decentralized environment, the collection of data could be separated. Customers could get paid for voluntarily offering their data to a data pool, which in turn can sell this to interested parties, leaving the ownership of the data completely with the customer. Like a certificate in Keybase.io, data could be revoked at any time. For the area of parametric insurance, oracles act as gateways to the physical world, providing provable and reliable ways to transfer data to smart contracts. Use of token: Reward for giving data. Reward for giving access to data pools. Staking / Reward for providing reliable oracles.

**4.3.4 Sales agents**

Decentralized distribution will emerge as the blockchain space emerges as a whole. Sales agents can offer insurance products to business or end customers, receiving a share of the profit. The token can be used as a means to distribute revenue and profits among all parties involved in the production of a specific insurance product. **Use of token: Reward for distribution of products; means for distribution of revenue & profits.**

**4.3.5 Claims agents and Prediction markets**

While the area of parametric insurance is rapidly growing in the ascent of IoT and the explosion of available data, there will remain many cases where an automatic detection and processing of claims is not possible, e.g. because the derivation of the loss from the event is to complicated or dependent on manual assessment. Specialized and sometimes independent claims agents already exists e.g. in the area of car insurance, where they help insurers to process claims in shorter time. These claims agents can immediately use a decentralized platform, as soon as adequate products are available. For other use cases, prediction markets could be used to decide on certain relevant triggers for specialized insurance contracts, like cat bonds. **Use of token: Reward for the provided service. Incentive to start bids on a prediction market.**

**4.3.6 License providers**

For the foreseeable future, insurance in most developed countries will depend on a proper license, which can be very difficult and costly to obtain. In some countries however, specialized companies offer “Protected Cell Company” model. In such a model, a license provider acts as an intermediary to regulators, bundling capital of many smaller projects to meet the minimum capital requirements. **Use of tokens: Staking tokens to provide capital for a license provider, paying fees for licenses.**

**4.3.7 Product Managers, Business Developers, Application builders.**

Product managers and Business Developers scan the market for opportunities and orchestrate the necessary participants needed to build the actual product. Application builders can offer single products or even complete development kits where you can “build your own insurance product” from some predefined templates. **Use of token: Reward for the provided service, fee for using application.**

**4.4 The iNET token: a protocol token**

InsureNET is building a platform for decentralized insurance applications. Corporates, large and small, not-for-profit groups and insurtech startups can all come together to provide better products and services across the whole insurance value chain. We aim to use blockchain technology to help make the purchase and sale of insurance more efficient; enable lower operational costs; provide greater transparency into the industry compared to traditional operations; and democratize access to reinsurance instruments. Blockchain can provide the means to disintermediate the market with a peer-to-peer risk platform that helps insurance return to its roots as society’s safety net. We even envisage new groups building their own bespoke insurance risk pools and services on the platform. And InsureNET will be a fully-compliant, fully licensed insurance platform for the emerging blockchain economy. The iNET token is a protocol token. A protocol token (also known as an ‘Appcoin’ or ‘coin’) is an electronic asset that underlies a network. Tokens perform all kinds of functions depending on the network or platform they back, i.e. users use filecoin to store files on a distributed file-storage network and entities with open hard drive space earn filecoin for storing files. Tokens are an exciting new way to incentivize distributed networks and many uses have yet to be invented! The iNET token is the building block for the emerging decentralized insurance economy on blockchain. InsureNET builds a decentralized insurance network which does not rely on an oligarchy of big parties, which control most of the business, like in the traditional insurance business. Instead, many participants can collaborate on new insurance products. Cooperation is welcome, also competition; but there won’t be artificial moats and barriers protecting some big players. The notorious market entry barriers like high capital requirements and regulatory obligations are removed. The iNET token enables the economy on this network: participants in the decentralized insurance network cooperate in building insurance products. With the token, you can:

* stake tokens as collateral
* buy insurance products
* interact with other participants to build decentralized insurance products
* pay the necessary fees and capitalization to obtain insurance licenses
* incentivize quality and proper behavior
* distribute revenues and profits among participants
* reward the provision of data by customers and participants
* pay oracles and prediction markets to resolve claims

The token itself does not add noteworthy friction to the network. The token does not generate revenue or profit. The use of the protocol itself is free, the protocol open source, this is guaranteed by a swiss-based not-for-profit foundation, the DI Foundation. In a second step, separate “Risk Pool Tokens” will enable the capitalization of risk pools for specific insurance risks and will provide new instruments, which will further drive the adoption of the platform.

**5 Tokenize Risk with Risk Pool Tokens**

We propose a token model which enables participants to buy and trade the “long-tail” risks of a decentralized insurance portfolio and to gain exposure to its revenue as an income stream. Together with the consumer-facing insurance application, this forms a complete and fully functioning “trustless” insurance system on the blockchain. These risk tokens can be traded on an an end-to-end automated insurance and reinsurance marketplace. This platform will require no human intervention, and will be highly transparent to both customer and participant sides of the marketplace. We expect these tokens to be true “securities”, because they will generate profits which are directly related to the managerial efforts of the creator, who provides the risk model for these tokens. Due to the significant complexity of regulations we will build such a token system as a second step after establishing the core operational insurance business. Nevertheless, we will give an outline of such a token system in the next sections.

**5.1 General Concept**

Conceptually, the platform has several components:

1. A risk pool, which holds a certain amount of reserve collateral used to issue and underwrite insurance policies against a predefined set of insurable events, within the framework of an insurance model.
2. A reinsurance pool, which holds extra collateral and reinsures the risk pool against catastrophic long-tail events which unexpectedly deplete the risk pool or render it unable to issue additional insurance.
3. A risk management system, which is a set of rules that governs the issuance, supply, inflation, and deflation of a digital token.
4. A **token marketplace**, which allows participants to purchase and redeem tokens at economically fair and transparently calculated prices.

Under normal operation, the reinsurance pool holds a non-zero amount of collateral. The system is designed to constrict the total amount of risk underwritten to an amount no greater than the amount of collateral held by the reinsurance pool. At the outset, the reinsurance collateral is gathered through an offering of an initial fixed supply of ERC20 tokens (a crowdsale), and thus the upper bound of the number of policies that can be underwritten with 100% collateral backing is established. The system can be tuned toward a desired maximum liability level where the total risk of the insurance portfolio is capped considerate of market forces. In turn, the risk pool automatically underwrites policies until this upper bound of policies is reached, and then ceases to underwrite policies. This is intended to ensure that every insurance policy is 100% collateralized and no customer can lose a payout to which she is entitled. (If this upper bound is reached but there is further demand for policies, the system's maximum liability parameter can be adjusted higher, and the system will automatically issue and sell tokens to support new policies with minimal dilution.) Also note that a $1M capitalization of the reinsurance pool will support a vastly larger throughput of policies than will likely be required in the early stages of the project. To support normal operation, a minimal collateral reserve is required to be held in the risk pool, and this value is determined by the insurance model. Insurance premiums are calculated as a function of this required collateral, the insurable event in question, and the desired payout for the policy at claim time. The exact calculation is specific to the model, but note that the risk pool is able to subsidize premiums by reserving excess collateral through a variety of means, such as seeding the pool with initial auxiliary capital or retaining revenue in the risk pool. At the time a customer purchases a premium, a 5-10% fixed fee will be assessed on the premium and allocated toward operational costs.

**5.2 Calculating the required capital**

The primary concern of any insurance model is to calculate the reserve capital required to guarantee solvency of the risk pool to some arbitrary and high confidence level, such as 99.99%. Under normal circumstances this results in an automated system where 15 risk is shared among policy holders. Since the actual collateralization of the risk pool is usually higher than the actual number of claims that must be paid, the risk pool has a positive probability expectation of revenue. When a policy expires without a claim, its premium becomes revenue and it is allocated as follows:

1. 10% is reserved in the risk pool to subsidize premiums.
2. 20% is paid to the reinsurance pool to subsidize long-tail risk collateral
3. 70% is paid pro rata to the holders of RSC-FDD tokens as dividends.

In exceptional circumstances, an outsized number of policies are claimed and this can result in depleting and exceeding the collateral reserved in the risk pool. In this case, the claim liability is paid out to customers from the reinsurance pool, whose precise function is to service this long-tail risk. An event which depletes the reinsurance pool in this way results in a level of collateral below the targeted liability level desired by the business, and the system will issue new ERC20 tokens in order to replenish the pool accordingly. The reinsurance pool is also replenished through the revenue flow described above, and tokens are automatically purchased back from the ERC20 token marketplace when the reinsurance capital exceeds the targeted capitalization. This, in turn, results in deflation of the ERC20 token supply (or an increase in potential acceptable business risk liability) and a token supply which remains “managed”, increasing only at the rate by which the business is able to increase its throughput of policies underwritten.

This proposed economics has several desirable properties:

1. **Solvency Guarantees.** No customer can lose money as insurance policies are underwritten against 100% collateralization in the risk and reinsurance pools. No insurance policy will ever be issued that is not fully backed by collateral.
2. **Natural Scalability**. If the demand for policies exceeds the available collateralization, the system has a natural mechanism to scale up to meet the desired demand through additional RSC-FDD token issuance. In the same way, it can naturally scale down to adjust to decreasing demand.
3. **Fair Token Pricing.** The fair price of tokens is transparent, as it is the present perpetuity value of a measurable dividend stream which is itself well-defined by the probability model of the insurance portfolio. Given a reasonable risk-free rate and the observed recurring revenue stream of the risk pool, the price of tokens can estimate without resorting to speculative markets for pricing.
4. **Value Proposition for Crowdsale Participants.** Under reasonable risk-free rates available on cryptocurrency-focused markets, such as the Poloniex BTC lending rate, and assuming modest utilization of the proposed insurance product, the fair pricing of tokens results in substantial incentives for crowdsale participants.
5. **Low Dilution.** Under reasonable risk-free rate assumptions and even modest utilization of the proposed scheme, dilution is likely to be low. This is due to the fact that tokens gain a substantial increase in value after an end-to-end beta product has been delivered without exceptional occurrences and expects a non-zero future revenue stream.

**5.4 Target Parameters of the Risk Model**

Participants will ask for the key parameters of our model, therefore we provide some estimates which we will elaborate more precisely in the future. Note that all values are subject to change.

|  |  |
| --- | --- |
| Parameter | Estimate |
| Risk pool solvency confidence level | 99.99% |
| Fixed service fee on premiums | 5-10% |
| Target return rate on reinsurance pool | 5-10% |
| Target maximum liability at launch | $1M |
| Target policy throughput | 2000 concurrent policies @500 average payout |

**6 Founder**

Founder and CEO: Jason E. Romero of Jacksonville, Florida

**6.1 Risk Management**

We have inventoried the main risks which come along with the disruption of a century old business in a completely new technological context. The risk monitoring and managing process will implement the requirements of the respective jurisdictions. The expertise for setting up a risk management system which fulfills the regulatory requirements is available in the founders’ team.

**6.2 General regulatory strategy**

InsureNET aims to enable fully-licensed and fully-regulated insurance products on its decentralized insurance platform. To achieve this ambitious goal, we have been in contact with regulators in multiple jurisdictions to educate them on the role and benefits of blockchain technology in the insurance space. We strongly believe regulatory safety is an essential component of a decentralized insurance platform, and we are working with both regulators and insurance partners in the major markets to be able to roll out commercial products. Acquiring proper authorizations in every market where we will be selling insurance is critical, and we expect to be authorized as an insurance company in one of our top target markets sometime between Q4 2020 and Q2 2021. Obtaining authorization to underwrite insurance is a collaborative process involving multiple partners and specialized service providers. Later this year, we will initiated an evaluation of insurance management companies to support our application for authorization. We also plan to share insurance licenses with other insurtech startups as licensing will be one of the services that the platform provides.

**7 Token Sale**

**7.1 Token Sale Structure and Timeline**

The terms & conditions of the token sale as well as the exact timeline will be described in a separate document, which will be published at the time of the announcement of the token sale.

**7.2 Deduction of token sale range**

From what has been said, we have a range of USD 5-10M for development costs and a starting point for capitalization of USD 12.5 - 15M. Coming to InsureNET, we have several additional factors to take into consideration:

1. Different from the startups mentioned above, which are typically financed over various rounds, InsureNET will need to capitalize in only one round.
2. InsureNET is operating in a completely new field, with less mature systems, with unproven economics. We are pioneers in every aspect of our model, and for this systemic risk an adequate capitalization is mandatory.
3. For the same reason, we expect that regulators will demand higher capital requirements than an equivalent insurance operating in a traditional model.
4. Ramping up our business can last longer than expected, and it is not yet clear how fast mass adoption of crypto currencies and crypto business models will start.

We therefore target a hard cap of USD 50M, but we can as well take off with as much as USD 20M. Reaching the hard cap would give us the runway to develop protocol and community more organically and would significantly reduce risks. But for every amount north of the minimum we can start as well.

**7.3 Protection of Participants and Transparency**

InsureNET is dedicated to a high degree of transparency, as long as legitimate interests of participants, customers and employees are taken into account. To work not only on InsureNET’s own transparency policy, but also enhance the transparency of the whole blockchain sector. InsureNET and the other members of Project Transparency follow a self-inflicted policy of making public the purpose of every use of funds which exceeds 0.5% of collected funds.

**7.4 Token Sale contract and audits**

The token sale smart contracts have been written by the team. The code has undergone three independent audits of well-known solidity experts, which will be published as soon as the final version of the contract is considered stable.

**7.5 Meeting capital requirements**

The funds collected from the token sale will be transferred to an InsureNET wallet. This transfer - which is, technically speaking, a donation - will enable the DI Foundation to accomplish its goals, which are hard-coded in its purpose. While the foundation will keep its own business lean and cost-effective, it will use its funds in two main areas:

1. Financing the development of the Decentralized Insurance Protocol and the community of customers, users and participants
2. Establishing commercial insurance companies and providing the capitalization for these companies, either alone or together with other partners, preferably from the insurance business.

We can deduce the funding goals for our token sale from these two fields, which require and empower each other. Of course, there is a large bandwidth for these numbers. In what follows, we will give lower and upper bounds together with indications how a higher funding will enable a broader or faster approach to our overall objectives. The dependency of the scope from the achieved funding is different for the two areas mentioned above.

For the first field - the development costs - and for simplicity and better understanding, we can organize our estimates in “Levels” (One, Two, Three, Four and Five) with the following meaning:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Level | Name | Description | Cost USD | FTE |
| 1 | One | Basic objectives and protocol components. Deliver single working product and achieve self-sustainability. Licensing and Regulations hashed out. | 5 Million | 15 |
| 2 | Two | More basic and some advanced objectives. Full protocol components and interaction with other protocols. Achieve revenue stream on deployed product(s). | 8 Million | 25 |
| 3 | Three | Accomplish most objectives. Full protocol and interaction with other protocols. Revenue stream for agents, underwriters and insureds. | 10 Million | 30 |
| 4 | Four | Begin risk trading platform with the risk pool tokens or iNETr tokens. Revenue stream for reinsurer. | 15 Million | 40 |
| 5 | Five | Full operation of all protocols and systems with working integrations. Revenue streams for all users. | 28 Million | 75 |

\*The funds will be spending over a period of 2 years. We calculate an FTE (Full Time Employee) with average cost of USD 100K per year. The costs will be covered by InsureNET Foundation proceeds.

For the second field - the capitalization of commercial entities, which act as subsidiaries of the foundation, the metric for the capitalization is different. Due to the basic regulatory approach the business volume of an insurance company is roughly proportional to its capitalization, because in insurance, business volume means risks, and risks need to be covered by own funds. To get an estimate, we can examine some quantitative material, e.g. the results of the famous “Quantitative Impact Study 5” 20 which was conducted prior to the introduction of Solvency II. It gives a very rough estimate for the ratio between the “SCR” - the Solvency Capital Requirement - and the sum of individual risks taken by an insurance company.

For $1M insured risks we need a minimum of about 41.2% = $412K own funds to fulfill the Solvency II capital requirements. The remaining risk is covered by diversification (35.1%) and sharing (23.7%). With that being said, level one will allow us to put over $5M of policy in force.

This number, however, is a minimum - most insurance company grossly overachieve this by factors up to more than 400%. This gross over estimate means that we could only provide $1M in coverage. We are going to consider this more carefully and do some more data modelling before publishing our results.

Furthermore, due to the operational complexity of an insurance business, an insurance company is difficult to operate at the bare minimum of capital. Economies of scale become effective at larger scales, and therefore we estimate the minimum solvency capital required to run a sustainable insurance at about USD 10M. Solvency capital is, however, only one part of the equation. Regulations in most countries require the provision of a separate “organizational fund” to finance the operational costs of ramping up an insurance business. The organizational fund is typically between 25-50% of the necessary solvency capital. In total, we can estimate the minimum total capital requirement for starting an insurance business between USD 12,5M - USD 15M.

This number is plausible, because it’s in the same magnitude as the bare minimum capital required to establish an insurance company in the United States. However, the same report shows that most promising startups are much better capitalized. Lemonade e.g. commands USD 60M after their third round, trove has USD 84 M and Indian based Digit Insurance has another USD 60M.

**7.6 Deduction of token sale range**

From what has been said, we have a range of USD 5-10M for development costs and a starting point for capitalization of USD 12.5 - 15M. Coming to InsureNET, we have several additional factors to take into consideration:

1. Financed over various rounds, InsureNET will need to capitalize in all rounds.
2. InsureNET is operating in a completely new field, with less mature systems, with unproven economics. We will be pioneers in every aspect of our model, and for this systemic risk an adequate capitalization is mandatory.
3. For the same reason, we expect that regulators will demand higher capital requirements than an equivalent insurance operating in a traditional model.
4. Ramping up our business can last longer than expected, and it is not yet clear how fast mass adoption of crypto currencies and crypto business models will start.

We therefore target a hard cap of USD 50M, but we can as well take off with as much as USD 20M. Reaching the hard cap would give us the runway to develop protocol and community more organically and would significantly reduce risks. But for every amount north of the minimum we can start as well.

**7.7 iNETr Token Migration**

Proceeds from selling iNET tokens have been used to back research and development and initial operational costs. iNET token holders will receive a fair share of iNETr-tokens in the upcoming “Token Generating Event” (TGE) for their engagement in an early stage of InsureNET. The conditions will be published together with the iNET token sale document.

**8 Credit Risk Model**

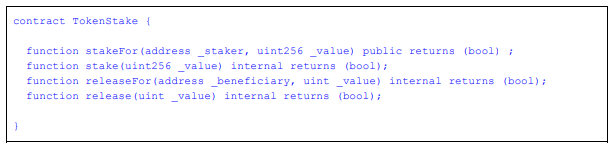
**9 Appendix**

**9.1 Partners**

* ACORD - information exchange regulation in the insurance industry

**9.2 Example:** **Use of an oracle in an insurance context**

The TokenStake contract serves as an abstract interface. It provides four functions: two functions for staking and two functions for releasing:



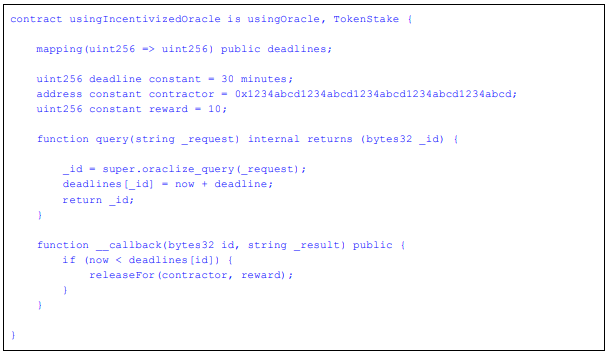
The staking functions are public, anyone can transfer tokens to the contract. To notify the contract about the incoming tokens, this has to be done in two steps:

1. The token owner approves the TokenStake contract over the sum of tokens to be staked.
2. The token owner calls stake or stakeFor.

The TokenStake contract then transfers the token to the TokenStake contract and records the tokens in an internal ledger. The release functions are internal, therefore the TokenStake contract itself has not much utility: If you transfer tokens to the original TokenStake contract, the tokens will be locked forever.

The TokenStake contract becomes useful if you extend it with some additional logic, which binds the release functions to some condition. This condition can be arbitrarily implemented. A typical use would be a time lock: the release function can be called after a certain block or time is reached. As a more complex example, we present another use case where the TokenStake contract is used to reward an oracle for providing the information in due time. First, we present the basic skeleton of a blockchain oracle.

A contract using this oracle will extend this interface. It will then call query() with a string containing the actual request (e.g. a http url with an api call, or an sql query). The actual oracle will watch the Query event, perform the query offchain, and then call \_\_callback with the result. The id parameter is used to discriminate parallel calls to the oracle. We can now extend this basic interface with a reward mechanism: the oracle receives 10 tokens for each \_\_callback which is performed within 15 minutes of the respective query and we plan to come up with a better bonus schedule and work with some additional partners in this space:



Finally, we put everything together in a simple insurance contract. We assume that somebody has already approved the insurance for the transfer of a number of tokens. In case of a timely delivery of the request, the oracle (with address contractor) receives 10 tokens. The oracle - simplified - checks the “weather” and yields “ok” if the area can be insured.

**ToDo:**

Tokenizing the policy assets on the blockchain.

Policy Ownership

Stakeholder payouts – how much and how often?

InsureNET payouts – how much and how often?

Fee schedule?

**Distribution Plan: (iNET ERC20 Token)**

iNET Tokens Uses:

* Purchase policy
* Pay commissions and fees
* Pay claims to Insureds, they can convert to ETH at their discretion
* Pay employees who can exchange or hold as well
* Pay stakeholders

How many tokens will be issued?

total supply = 100,000,000 (100 Million)

How many sold during each stage of sale?

Private, Pre and Post sales (Bonuses)

How will we issue additional tokens?

Value: 1 ETH = 100 iNET

**Growth Potential:**

**Ethereum Wallet Address Growth:**

**Total Transactions Value Growth:**

**Distribution Plan (iNETr ERC721 Authentication Token)**

These tokens are for our clients, insureds, agents, brokers, stakeholders, investors, employees and owners to authenticate on our platform of services.

**Platform Release Date:**

Ethereum MainNet:

Ethereum Rinkeby:

Ethereum Kovan:

Ethereum Ropsten: 2020-04-01

**Roadmap:**

*03/2020 –*

*05/2020 –*

*08/2020 –*

*12/2020 –*